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NASA-02920 (June 2004)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA

Superseding NASA-02920 (March 2003)

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SECTION 02920

LAWNS AND GRASSES

06/04

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NATIONAL AERONAUTICS **NASA**
AND SPACE ADMINISTRATION **Superseding NASA-02920**
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SECTION 02920

LAWNS AND GRASSES
06/04

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers spreading topsoil, seeding, and/or sodding over a prepared subgrade specified under Section 02311, "Excavating, Backfilling, and Compacting for Structures," and Section 02315, "Exavation and Fill."

Drawings must indicate the limits of work including the location of lawn and field grass areas, final grades and contours, and location of water-supply sources that may be used by the Contractor.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

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The publications listed below form a part of this section to the extent referenced:

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 92	(2003) Wire-Cloth Sieves for Testing Purposes

ASTM INTERNATIONAL (ASTM)

ASTM C 602	(1995; R 2001) Agricultural Liming Materials
ASTM D 2028	(1997; R 2004) Standard Specification for Cutback Asphalt (Rapid-Curing Type)

ASTM D 2399 (1983; R 1999) Standard Practice for Selection of Cutback Asphalts

1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01330, "Submittal Procedures," and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.
****

The following shall be submitted in accordance with Section 01330, "Submittal Procedures," in sufficient detail to show full compliance with the specification:

SD-09 Manufacturer's Field Reports

Laboratory analysis of Grass Seed for percent pure, percent germination, and percent weed seed, along with laboratory analysis of proposed Top Soil shall be submitted.

1.3 SAMPLING AND TESTING

Sampling and testing of grass seed and topsoil shall be by an approved testing service and show compliance with all specified requirements.

1.4 DELIVERY AND STORAGE

1.4.1 Seed and Fertilizer

Grass seed and fertilizer shall be delivered in sealed containers or bags, each labeled in accordance with the applicable federal and state regulations and bearing the name, trade name or trademark, and certification of the producer.

Packaged materials shall be stored off the ground, under watertight cover, and away from damp surfaces.

1.4.2 Sod Delivery

Dumping from vehicles will not be permitted. If stacked during transit or storage, the sod shall be placed roots to roots or grass to grass. During delivery and while in stacks, sod shall be kept moist and cool, and protected from sun, air, and freezing.

1.5 WEATHER LIMITATIONS

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NOTE: Insert calendar dates in blanks.
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Topsoil shall not be placed when the subgrade is [frozen] [excessively wet] [extremely dry] [or] [in a condition detrimental to grass seed planting or

finish grading]. Sodding shall be performed between [_____] and [_____].

Seeding shall be done between [_____] and [_____], and sodding shall be done between [_____] and [_____] unless otherwise permitted.

PART 2 PRODUCTS

2.1 TOPSOIL

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NOTE: Delete the first of the following paragraphs when topsoil will be provided by the Contractor. Delete the second, third, and fourth paragraphs when Section 02315, "Exavation and Fill," is a part of the contract.
****

Topsoil previously removed and stockpiled shall be used in the work. Topsoil shall be free from subsoil, litter, and other objectionable material.

Topsoil shall be fertile, friable, natural surface soil obtained from well-drained areas and possessing characteristics of representative soils in the project vicinity that produce heavy growths of crops, grass, or other vegetation. Topsoil shall be free of material that might be harmful to plant growth or hindrances to planting or maintenance operations.

Chemical and physical properties of topsoil proposed for use in the work shall be as follows:

Organic matter shall be at least 6 percent as determined by loss on ignition of moisture-free samples of topsoil.

The pH range shall be from 5.0 to 7.0.

The physical analysis of the topsoil shall be within the following limits: (AASHTO M 92)

SIEVE SIZE	PERCENT PASSING		
1 inch	99 to 100	25 millimeter	99 to 100
1/4 inch	97 to 99	6.3 millimeter	97 to 99
No. 100	40 to 60	150 micrometer	40 to 60
No. 200	20 to 40	75 micrometer	20 to 40

2.2 TOPSOIL BLEND

Where insufficient topsoil is removed from the project site, the topsoil removed shall be stockpiled and blended with compost at the site to achieve the required volume.

2.3 GRASS SEED

Grass seed for lawn areas shall be as follows:

KIND OF GRASS SEED	GRASS SEED IN MIXTURE BY WEIGHT PERCENTAGE	GRASS SEED PURITY MINIMUM PERCENTAGE	GRASS SEED GERMINATION MINIMUM PERCENTAGE
Common Bermuda grass unhulled	[__]	97	85
Brown Top Mullet	[__]	90	85
Annual rye grass	[__]	98	90
Kentucky 31 Tall Fescue	[__]	98	91
Kentucky Blue	[__]	98	90
Redtop	[__]	92	95
White clover	[__]	98	90 including hard seed
Pensacola Bahia	[__]	95	80
Argentine Bahia	[__]	95	80
[_____]	[__]	[__]	[__]

[Clover seed shall be inoculated with nitrogen fertilizer applied in accordance with the manufacturer's recommendations.]

Grass seed for field grass areas shall be [perennial domestic rye] [pensacola bahia] [_____] grass having not less than 90 percent germination. Weed seed shall be not more than 0.5 percent by weight of the total grass seed mixture.

Grass seed which has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable.

2.4 SOD

[Saint Augustine sod, when delivered, shall be living, growing grass consisting of stolons, crown, rhizomes, and roots with attached soil. Sod shall have a density such that when cut in oblong strips 1 foot 300 millimeter wide it can be lifted and handled without breaking. Such sod shall be interpreted to include grass that is seasonably dormant from either cold or drought and capable of renewing growth. At least 95 percent of the living part of the sod shall consist of Saint Augustine grass. Sod shall be free of perennial weeds and other undesirable plants such as nutgrass and Johnson grass as well as stones, roots of trees and brush, and other material which might be detrimental to the development and future maintenance of the grass.]

[Pensacola or Argentine Bahia sod shall be well matted with live grass roots. Sod shall be sufficiently thick to hold together during handling operations and to obtain a satisfactory growth of grass. Sod shall be live, fresh, and uninjured at the time of planting and it shall be the

Contractor's responsibility to ensure that it contains sufficient moisture at planting to produce growth. Before the sod is harvested, the grass shall be mowed to the average height normally maintained for that variety of grass and shall have all clippings removed. Presence of weeds or other material which might be detrimental to the proposed planting will be cause for rejection of sod.]

Rectangular sections used for sodding may vary in length but shall be of equal width and of a size that will permit lifting on boards or that can be otherwise handled without breaking and without loss of native soil attached to the roots.

2.5 LIME

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NOTE: Delete the paragraph heading and the following paragraph when topsoil will be furnished by the Government and the pH value of the topsoil is above 6.0.
****

Lime shall be agricultural ground limestone having a calcium-carbonate equivalent of not less than 80 percent, ground to such fineness that at least 99 percent will pass through a No. 8 2.36 millimeter (No. 8) sieve and at least 75 percent will pass through a No. 60 250 micrometer (No. 60) sieve, and meet the requirements of ASTM C 602, agricultural limestone Class Designation T.

2.6 FERTILIZER

Fertilizer shall be commercial Grade [__]-[__]-[__] mixed fertilizer.

2.7 MULCH

Mulch shall be salt or bahia hay or threshed straw of wheat, rye, oats, or barley and shall be clean and free of seeds.

Mulch that is fresh and excessively brittle or that is in such an advanced stage of decomposition as to smother or retard the growth of grass will not be acceptable.

2.8 ASPHALT EMULSION

Asphalt emulsion shall meet the requirements of ASTM D 2028 or ASTM D 2399.

PART 3 EXECUTION

3.1 TOPSOIL PREPARATION

3.1.1 Subgrade

Before topsoil is placed, the subgrade surface shall be cleared of all materials that might hinder the performance of the work or subsequent maintenance operations.

3.1.2 Grading

Grades on areas that have been previously established shall be maintained in a true and even condition.

Where grades have not been established and where improperly graded, areas shall be uniformly graded. Finished surfaces shall be smooth within a tolerance of 0.1-foot 30.5 millimeter above or below the indicated subgrade elevations, with uniform levels or slopes between the points where elevations are indicated or between such points and existing grades and free from irregular surface changes to prevent the formation of depressions where water will accumulate.

3.1.3 Tillage

Immediately prior to placing the topsoil, the subgrade, wherever excessively compacted by traffic or other cause, shall be loosened to a depth of at least 3 inches 75 millimeter by plowing, discing, harrowing, or other approved means.

3.1.4 Placing Topsoil

Suitable topsoil shall be placed in the top [_____] inches millimeter of all grassed areas stripped under this project. All areas to receive topsoil, including cut and fill areas, shall be shaped to provide a minimum of [_____] inches millimeter topsoil. Prior to placement of the topsoil, the subgrade shall be scarified to a depth of 2 inches. 50 millimeter. Topsoil shall be uniformly distributed and evenly spread to an average thickness of [_____] inches millimeter. Spreading shall be performed in such a manner that planting can proceed with little additional soil preparation or tillage, and the area shall be left smooth and suitable for lawns. Irregularities in the surface from topsoiling or other operations shall be corrected so as to prevent the formation of depressions where water will stand. Topsoil shall not be hauled and placed when wet or when the subgrade is [frozen] [excessively wet] [extremely dry] [or] in a condition otherwise detrimental to the proposed planting or to proper grading. Topsoil shall be spread uniformly but shall not be compacted. Where any portion of the surface becomes gullied or otherwise damaged, the affected area shall be repaired to establish the condition and grade prior to topsoiling, and then shall be re-topsoiled.

3.1.5 Application of Lime

****

NOTE: Delete the paragraph heading and the following paragraph when the pH value of the topsoil furnished by the Government is above 6.0. Fill in blank spaces.

****

Lime shall be uniformly distributed over the topsoil surface at a rate of [_____] pounds per [_____] square feet[_____] kilogram per [_____] square meter and incorporated into the topsoil to a depth of at least 3 inches 75 millimeter by discing, harrowing, or other approved means.

3.1.6 Application of Fertilizer

Fertilizer shall be uniformly distributed over the topsoil surface at a rate of [_____] pounds per [_____] square feet [_____] kilogram per [_____] square meter [, and incorporated into the topsoil to a depth of at least 1 inch 25 millimeter by discing, harrowing, or other approved means].

Fertilizer may be applied mixed with seed and water as specified in

paragraph entitled, "Seeding."

3.1.7 Smooth Grading

Undulations or irregularities in the topsoil surface resulting from operations shall be leveled.

Topsoil surface shall be made smooth and uniform.

3.1.8 Cleanup

After smooth grading, the topsoil surface shall be cleared of stones or other objects that might be a hindrance to planting or maintenance operations.

Topsoil or other material that has been brought upon the surfacing of paved areas by operations shall be removed daily.

3.2 SEEDING

3.2.1 Method of Sowing

Seeding, making use of a mixture of seed, fertilizer, and water applied by special mobile equipment designed for the purpose, may be employed subject to approval. When the above method of seeding is employed, covering seed and compaction operations specified will be waived.

3.2.2 Preparation of Seedbed

Seedbed shall be loose and porous at the time of seeding. When necessary, the seedbed shall be loosened to a depth of at least [_____] [3] inch [75] millimeter by harrowing or other suitable means and the surface smooth-graded and cleared of objectionable material as specified.

3.2.3 Planting Seed

Grass seed shall be uniformly distributed over the prepared seed bed.

For lawn areas, the rate of seeding shall be [_____] pounds kilogram per [_____] square feet meter.

For field grass areas, the rate of seeding shall be [_____] pounds kilogram per [_____] square feet meter.

Immediately after seed planting, the area shall be lightly raked or lightly harrowed to cover the seed to an average depth of 1/4 inch 6 millimeter.

3.2.4 Compacting

Immediately after the completion of seeding operations and raking, the entire area shall be compacted by means of suitable compacting equipment.

Compacting equipment shall consist of approved equipment weighing 60 to 90 pounds per linear foot loading to 875 to 1315 newtons per meter of roller width and shall be suitable for the soil material being compacted. Wheels of pneumatic-tired rollers shall be so spaced that one pass of the roller will accomplish complete coverage equal to the rolling width of the equipment.

3.3 MULCHING

3.3.1 Placing Mulch

Not more than 48 hours after the completion of seeding operations, mulch shall be spread uniformly over the entire area in a continuous blanket having a depth of not more than 1-1/2-inches 38 millimeter loose measurement using approximately [_____] pounds kilogram of mulch per [_____] square feet meter.

Mulch shall be spread by hand or approved equipment. Mulching shall be started at the windward side of relatively flat areas, at the upper part of steep slopes, and shall continue uniformly until the area is completely covered.

3.3.2 Anchoring Mulch with Asphalt Emulsion

Mulch shall be anchored in place by a spray coating of asphalt emulsion uniformly applied at the rate of 10 to 13 gallons per 1,000 square feet 41 to 53 liter per 100 square meter. Precautions shall be taken to prevent the asphalt emulsion from damaging or disfiguring structures and other property on or adjacent to the mulched area.

3.3.3 Anchoring Mulch with Machinery

Mulch shall be anchored in place by a Coulter disc mulch-anchoring machine or other suitable equipment that will secure the mulch firmly in the ground to form a soil-binding mulch and prevent loss or bunching of the mulch by the wind. The number of passes over the mulch needed to secure it firmly to the soil shall in no case exceed three.

On slopes and other areas where machinery cannot be satisfactorily used, the mulch shall be anchored in place by a spray coating of asphalt emulsion, by twine and softwood stakes, or by other approved means.

3.4 SODDING

3.4.1 General

After the sod has been harvested, it shall be delivered to the site and laid in place within 48 hours. Any sod that has been damaged by handling or storage, turned yellow or shows definite indications of dying, will be rejected.

3.4.2 Solid Sodding

Sod shall be laid smoothly, edge to edge, and with staggered joints. Sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment, to eliminate all air pockets, provide a true and even surface, and ensure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Any excess soil accumulated from handling of the sod shall be used to fill voids or cracks between the sections of sod.

3.4.3 Spot Sodding

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NOTE: Use spot or strip sodding with grasses that have chutes or runners only.

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Sod for spot-sodding or sprigging shall be cut into blocks at least 3-inches 75 millimeter square. Individual blocks of sod shall be placed in alternating rows spaced 18-inches 450 millimeter apart and 18 inches 450 millimeter on center. Sod shall be planted in individual holes 4 by 4 inches to 6 by 6 inches 100 by 100 to 150 by 150 millimeter in size, made with a sharpshooter shovel, mattock, or similar tool. Acceptable topsoil removed from the holes shall be used to fill the space between the sod block and edge of the hole. Sod shall be pressed firmly into the soil by tamping with a hand tamper or with an acceptable smooth-surfaced, steel roller. Surface of the finished sod shall be even with the surface of the top of the adjacent surface soil.

3.4.4 Strip Sodding

Sod for strip-sodding shall be solid strips at least 6 inches 150 millimeter wide for sodding rows along the top and toe of slope and at least 3-inches 75 millimeter wide for sodding in intermediate rows. Solid strips of sod shall be placed end-to-end in continuous parallel straight trenches dug across the face of the slope with a sharpshooter shovel, mattock, or similar tool. Trenches shall be sufficiently wide and deep to receive the sod strips and allow space at each side of the sod for backfilling with loose topsoil. Acceptable topsoil removed from the trenches may be used for backfill. Sod shall be firmly pressed into the soil by tamping with a hand tamper or with an acceptable smooth-surfaced, steel roller.

3.5 GRASS ESTABLISHMENT

3.5.1 General

The period of grass establishment shall begin immediately after the completion of mulching in an area and shall continue for a period of 2-months after the completion of seeding on the entire project unless the desired grass cover is established in a shorter period of time and shortening of the grass-establishment period is authorized.

3.5.2 Watering

Contractor shall provide and maintain temporary piping and lawn-watering equipment required to convey water from the water source to uniformly water the seeded areas. Water shall be free from substances detrimental to the growth of vegetation. Water sources located on Government property will be subject to approval prior to use. Temporary watering equipment shall be removed after grass area acceptance.

Watering schedules shall be arranged and lawn-watering equipment laid out in a manner to avoid the necessity of walking over muddy and newly seeded areas.

Watering shall be done in a manner to prevent the displacement of seed and mulch and to prevent puddling and water erosion.

Immediately after the completion of mulching in an area, the area shall be moistened to a depth of 3 inches 75 millimeter or more.

After the initial watering, the seeded areas shall be watered as required to maintain the soil in a moist condition for the entire

grass-establishment period.

3.5.3 Mowing

[When the average height of grass reaches 2-1/4 inches, 60 millimeter, seeded lawn areas shall be mowed with approved mowing equipment to a grass height of 1-1/2 inches 40 millimeter. When the amount of cut grass is heavy, the cuttings shall be removed to prevent smothering the grass.]

[When the average height of grass reaches 8 inches 200 millimeter or when the grass growth tends to smother the seedings, seeded field-grass areas shall be mowed with approved mowing equipment to a grass height of 4 inches. 100 millimeter.]

3.5.4 Weeding

Weeds or other undesirable vegetation that threaten to smother the grass shall be uprooted and removed from the area.

3.5.5 Refertilizing

After the first mowing and during a period when the grass is dry, fertilizer shall be uniformly distributed over the seeded area at a rate of 2 pounds 1.0 kilogram of actual nitrogen per 1,000 square feet 93 square meter. Fertilizer shall be as specified.

3.5.6 Reseeding

After the first mowing, bare areas shall be reseeded.

Reseeding shall be with the grass seed specified for each seeded area and shall be sown at the rate specified and in a manner that will cause a minimum of disturbance to the existing stand of grass and mulch.

3.5.7 Remulching

In areas where mulch has been disturbed sufficiently to nullify its purpose, new mulch shall be added and anchored as specified.

3.5.8 Resodding

The area on which an acceptable stand of grass is not present shall be sodded as specified for the original planting. An acceptable stand is living grass from at least 90 percent of the sod placed according to this specification. Areas on which there is not an acceptable stand of grass shall continue to be replanted throughout the maintenance period until an acceptable stand of grass is present.

3.6 ACCEPTANCE PROVISIONS

3.6.1 Acceptance Requirements

Completed grass areas shall have been recently mowed and be covered with a uniform stand of the specified grass, be free of rank growths of weeds or other undesirable vegetation, and be free of irregular surface changes and other depressions where water will accumulate.

Scattered bare spots not larger than 6 inches 150 millimeter in any dimension will be allowed, up to a maximum of 3 percent of any grass area.

Condition of grass areas at the time of inspection will be noted and a determination, made whether the grass-establishment period shall be extended for any area.

3.6.2 Repairs

If, before completion and acceptance of the entire work, portions of the surface become gullied or otherwise damaged following seeding or the grass seedings have been destroyed, the affected area shall be repaired to re-establish the condition and grade of the soil prior to seeding and then re-seeded, remulched, and the grass established as specified.

3.7 PROTECTION

Seeded areas shall be protected against traffic or other use by erecting barricades around each area immediately after seeding is completed and by placing warning signs of an approved type on each seeded area.

-- End of Section --